

Unpacked South Dakota State Mathematics Standards

Purpose: *In order for students to have the best chance of success, standards, assessment, curriculum resources, and instruction must be aligned in focus, coherence, and rigor. Unpacked standards documents are intended to help align instruction to the focus, coherence, and rigor of the South Dakota State Mathematics Standards. The standards have been organized in clusters as they are not so much built from topics, but rather woven out of progressions. Not all content in a given grade is emphasized equally in the mathematics standards. Some clusters require greater emphasis than others based on the depth of the ideas, the time that they take to master, and/or their importance to future mathematics or the demands of college and career readiness. To say that some things have greater emphasis is not to say that anything in the standards can safely be neglected in instruction. Neglecting standards will leave gaps in student skill and understanding and may leave students unprepared for the challenges of a later grade.*

Domain: Number and Quantity		Grade Level: 4th Year
HS4.N.CN.A Cluster: Perform arithmetic operations with complex numbers. Students are learning to divide and find the absolute value of complex numbers.		
<p>This is a SUPPORTING cluster. <i>Students should spend the large majority of their time (65-85%) on the major work of the grade. Supporting work and, where appropriate, additional work should be connected to and engage students in the major work of the grade.</i></p> <p>N.CN.3 Find the conjugate of a complex number; use conjugates to find moduli and quotients of complex numbers.</p>		
Aspects of Rigor of Student Learning: (Conceptual, Procedural, and/or Application)		
N.CN.3 Find the conjugate of a complex number; use conjugates to find moduli and quotients of complex numbers.		
Conceptual Understanding	Procedural Fluency	Application
Students understand that a complex number divided by a complex number will result in a complex number. In order to find the quotient, students will know to use the conjugate. Students can use a graphical representation of a complex number to find that the moduli $ z $ is the length of the vector.	Students will be able to find the conjugate of a complex number and use that conjugate to find the quotient and moduli of complex numbers.	
Enacting the Mathematical Practices - Evidence of Students Engaging in the Practices		
<ol style="list-style-type: none"> 1. Make sense of problems and persevere in solving them. 2. Reason abstractly and quantitatively. 3. Construct viable arguments and critique the reasoning of others. <ul style="list-style-type: none"> • Students must explain and justify the steps used in the calculation of complex quotients. 4. Model with mathematics. 5. Use appropriate tools strategically. 6. Attend to precision. 7. Look for and make use of structure. <ul style="list-style-type: none"> • Students will use a graphical interpretation of a complex number to describe the modulus. 8. Look for and express regularity in repeated reasoning. 		
Vertical and Horizontal Coherence and Learning Progressions		
<i>Previous Learning Connections</i>	<i>Current Learning Connections</i>	<i>Future Learning Connections</i>

In Algebra II, students were introduced to complex numbers and learned to add, subtract, and multiply complex numbers.	Students are learning to divide and find the absolute value of complex numbers.	Students will use complex numbers in a finite math or survey of math course Students will use complex numbers in a College Algebra course..
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Vocabulary (key terms and definitions)

- Moduli
- Conjugate

Relevance, Explanations, and Examples:

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